

WHAT IS CLAIMED:

1. A system for propelling a vehicle, comprising:
 - a primary power source for propelling the vehicle at a time after the vehicle is initially propelled;
 - a secondary power source for initially propelling and accelerating the vehicle prior to activation of the primary power source; and
 - a controller for determining a weight of the vehicle based on initial acceleration of the vehicle, for determining a driver torque request, and for activating the primary power source when the weight of the vehicle exceeds a predetermined threshold vehicle weight value and the driver torque request exceeds a predetermined threshold torque value.
2. The system according to claim 1, wherein the primary power source comprises an internal combustion engine.
3. The system according to claim 1, wherein the primary power source comprises a fuel cell engine.
4. The system according to claim 1, wherein the secondary power source comprises an electrical storage device coupled to at least one electric machine.
5. The system according to claim 1, wherein the controller further comprises means for estimating the weight of the vehicle as a function of an operating parameter of the secondary power source.
6. The system according to claim 1, wherein the controller further comprises means for estimating the weight of the vehicle as a function of an initial acceleration of the vehicle.
7. The system according to claim 1, wherein the controller further comprises means for estimating an initial acceleration of the vehicle.
8. The system according to claim 1, wherein the controller further

comprises means for estimating the weight of the vehicle as a function of a traction force at drive wheels of the vehicle.

9. The system according to claim 1, wherein the secondary power source further comprises a plurality of electric machines, and wherein the weight determining step comprises the step of estimating a traction force at drive wheels of the vehicle based on torque delivered by the plurality of the electric machines.

10. A method of operating a vehicle having a plurality of power sources for propelling the vehicle, the method comprising:

using one of the power sources to initially accelerate the vehicle;

determining a weight of the vehicle based on initial acceleration of the vehicle;

determining a driver torque request; and

activating another of the power sources when the weight of the vehicle exceeds a predetermined threshold vehicle weight value and the driver torque request exceeds a predetermined threshold torque value.

11. The method according to claim 10, wherein the step of using one of the power sources to initially accelerate the vehicle comprises using one of the power sources as a secondary power source of the vehicle to initially accelerate the vehicle; and wherein the activating step comprises using another of the power sources as a primary power source of the vehicle.

12. The method according to claim 11, wherein the primary power source comprises an internal combustion engine.

13. The method according to claim 11, wherein the primary power source comprises a fuel cell engine.

14. The method according to claim 11, wherein the secondary power source comprises an electrical storage device coupled to at least one electric motor.

15. The method according to claim 10, wherein the weight determining

comprises the step of estimating the weight as a function of an operating parameter of the one of the power sources used to initially accelerate the vehicle.

16. The method according to claim 10, wherein the weight determining step comprises the step of estimating an initial acceleration of the vehicle.

17. The method according to claim 10, wherein the weight determining step comprises the step of estimating a traction force at drive wheels of the vehicle.

18. A method for minimizing user-discernible ride inconsistency attributable to starting of an internal combustion engine of a vehicle having at least an internal combustion engine and an electrically powered motor, the method comprising:

determining a weight of the vehicle;

comparing the weight of the vehicle with a predetermined threshold vehicle weight value;

generating a driver torque request;

comparing the driver torque request with a predetermined threshold torque value; and

starting the engine when the weight of the vehicle is greater than the predetermined threshold vehicle weight value and the driver torque request is greater than the predetermined threshold torque value, the starting of the engine being controlled to occur when the motor has sufficient torque capacity to be controlled in a manner that negates opposing torque effects imposed by the starting of the engine.

19. The method according to claim 18, further comprising the step of controlling a generator to cooperate with the motor to start the engine, the generator being connected to the engine via a planetary gear set.

20. The method according to claim 18, further comprising the step of quantifying the predetermined threshold vehicle weight value to be approximately equal to the weight of the vehicle in an unloaded state.

21. The method according to claim 18, further comprising the step of

quantifying the predetermined threshold torque value to be approximately equal to a maximum torque output capacity of the motor.

22. The method according to claim 18, further comprising the steps of:
determining whether the engine is in a running state;
proceeding with the comparing steps when the engine is not in a running state; and
terminating the comparing steps when the engine is in a running state.

23. The method according to claim 18, wherein the weight determining step comprises the step of estimating the weight of the vehicle based on an initial acceleration of the vehicle.

24. The method according to claim 18, wherein the weight determining step comprises the step of estimating the weight of the vehicle based on a traction force experienced at drive wheels of the vehicle.

25. The method according to claim 18, wherein the vehicle further comprises a generator for cooperating with the motor to start the engine, and wherein the weight determining step comprises the step of estimating a traction force at drive wheels of the vehicle based on a motor-delivered torque and a generator-delivered torque.